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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09 867,688 | 05/31/2001 | Akira Nishiya | KKH-010 | 7223 |

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EXAMINER

JOLLEY, KIRSTEN

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1762

DATE MAILED: 06/03/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/867,688

Applicant(s)

NISHIYA ET AL.

Examiner

Kirsten Crockford Jolley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 31 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213

Disposition of Claims

- 4) ☐ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 17-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

1. Claims 1-16 are pending in the application. Claims 17-19 remain withdrawn from consideration as being directed to a non-elected invention.

Response to Arguments/Amendments

2. The 35 USC 112, 2nd paragraph rejections have been withdrawn.

3. The 35 USC 102 rejections over Mimasaka et al., Hirano et al., and Fujimoto et al. have been withdrawn in response to Applicant's amendments to the claims.

4. Applicant's arguments filed March 31, 2003 have been fully considered but they are not persuasive.

With respect to the 35 USC 102(b) rejection over JP '429, Applicant argues it is disclosed that the substrate is rotated after being developed in a stationary condition, however water is also supplied on this occasion, therefore the rotation is not for "stirring" but rather for casting off the developing solution from the substrate after the completion of developing. Applicant also argues that JP '429 does not disclose, teach or suggest that after the substrate is rotated, the substrate is developed again in a stationary condition.

The Examiner notes that JP '429 teaches stationary developing in the second stage of its process illustrated in Figure 2, followed by rinsing and rotating. However, the Examiner notes that in the first stage of JP '429 while dispensing of developer solution and developing occurs, the substrate is rotated in a first normal rotation direction, followed by the reverse direction, followed by the first rotation direction again, followed by rotation in the reverse direction again, etc. It is noted that, in the point in time where

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the substrate switches direction of rotation, the substrate is inherently stationary/stopped, even if only for an instant of time or a fraction of a second, and since developing solution is present on the substrate, developing is occurring during the instant that the substrate is stationary. Therefore, the first stage (illustrated in Figure 2) of the method of JP '429 involving the repeated reversing of spinning direction necessarily meets the claimed limitation of developing the substrate in a stationary condition while stopping for a second predetermined period of time, stirring the developing solution by rotating the substrate after the second predetermined period of time, and then developing the substrate in a stationary condition for a third predetermined period of time. The step of rotating the substrate inherently stirs the developing solution on the substrate. Finally, in the third stage of JP '429's method, there is a step of washing the substrate while rotating the substrate; this occurs after the third predetermined period of time.

With respect to the 35 USC 102(e) and 103(a) rejections over Subramanian et al., Applicant argues it is not disclosed that after a developing solution is supplied to a substrate, the substrate is developed in stationary condition while being stopped, the developing solution on the substrate is stirred after a predetermined period of time so that its concentration is made uniform, and thereafter the substrate is developed again in stationary condition. Applicant argues that in Subramanian et al., after the substrate is developed in stationary condition, only the thickness of a developed resist film is measured.

It is the Examiner's position that the method of Subramanian et al. meets the limitation of claim 1 for similar reasons as described above for the JP '429 reference.

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Specifically, Subramanian et al. discloses in Figure 8 a process where the substrate is spun in a first direction and developer solution is applied to the substrate (steps 240 and 250). At step 260, the spin direction of the wafer is reversed, therefore the substrate is inherently stopped for a period of time (see col. 6, line 42) while developer solution is present on the substrate, meeting Applicant's limitation of developing the substrate in a stationary condition for a second predetermined period of time. Then in step 260, the substrate is spun in the reverse direction which inherently stirs the developer solution. Finally, in steps 280 and 290, Subramanian et al. teaches further developing the substrate in a stationary condition for a third predetermined period of time.

Examiner's Suggestions

5. In claim 1, lines 11-12, the Examiner suggests that the last step of "washing the substrate while rotating the substrate after the third predetermined period of time" is referred to as a "third step," instead of being included in the second developing step, because the specification refers to the washing step as a step separate from the developing step.

6. With respect to claims 14 and 16, the Examiner suggests that the phrase "after said stirring step" which appears at the end of line 4 is moved to line 2 between "substrate" and "while" because line 4 appears to read as "the direction in which the substrate is rotated after said stirring step" (and there is not a step of rotation after the stirring step). Additionally, the Examiner suggests removing "above" in line 4, and adding "in said first step" after "in which the substrate is rotated," in order to clarify that

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the opposite rotation direction refers to the opposite rotation direction of the *first* supplying step.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-5 and 13-16 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 63-132429 A.

The claims remain rejected for the reasons discussed in the prior Office action, as well as for the reasons discussed above in paragraph 4.

9. Claims 1-2, 5, and 13-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian et al. (US 6,248,175).

The claims remain rejected for the reasons discussed in the prior Office action, as well as for the reasons discussed above in paragraph 4.

Claim Rejections - 35 USC § 103

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10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian et al. (US 6,248,175).

The claims remain rejected for the reasons discussed in the prior Office action, as well as for the reasons discussed above in paragraph 4.

12. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 63-132429 A.

JP '429 is applied for the reasons discussed above and in the prior Office action. JP '429 lacks a teaching of supplying developer solution onto the substrate while moving the supply nozzle from one end of the substrate to a second end. JP '429 teaches that this method is a known prior art method on page 3 of the attached English translation. It is the Examiner's position that it would have been obvious to have substituted this method for dispensing developer solution onto the substrate, in place of supplying developer solution only at the middle of the substrate, with the expectation of similar and successful results since both methods are known in the prior art as effective means for supplying developer solution onto a semiconductor substrate in a spin coating process.

Conclusion

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13. It is noted that an English translation of JP 63-132429 A is attached.
14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten Crockford Jolley whose telephone number is 703-306-5461. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on 703-308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193.

kcj *Ycj*
May 30, 2003

Shrive P. Beck
SHRIVE P. BECK
SUPERVISORY PATENT EXAMINER
TECHNICAL CENTER 1700